West Nile Virus (WNV) in Massachusetts
An Update for Health Care Providers

Massachusetts Department of Public Health (MDPH)
Division of Epidemiology and Immunization

Background

West Nile virus (WNV) is a flavivirus first isolated in 1937 from a resident of the West Nile district of Uganda. It was introduced into the United States in 1999 and is now found in most parts of the country, including Massachusetts.

The virus is maintained in nature in a bird-mosquito cycle that occasionally spills over into mammals, including humans. Humans are considered incidental hosts and do not perpetuate the cycle. The highest risk for human infection with WNV in Massachusetts occurs generally in early August through late October.

Human WNV Cases Identified in Massachusetts by Year, 2000-2006

Year	Number of Cases	Number of Fatalities
2000	0	0
2001	3	1
2002	24	3
2003	19*	1
2004	0	0
2005	6	1
2006	3	0
Total	**55**	**6**

* One case believed to have contracted WNV outside of MA

While the majority of human infections with WNV have resulted from bites by infected mosquitoes, other rare modes of transmission have been identified, including blood transfusion and organ transplantation from infected donors, occupational sharps injury exposures, transplacental transmission, and probable transmission via breast milk.

When to Suspect WNV

The incubation period for WNV infection ranges from 2 to 14 days. While most WNV infections are asymptomatic, 20% of those infected may experience a systemic, self-limited illness with headache, myalgias and arthralgias, which is sometimes accompanied by skin rash or lymphadenopathy. Approximately 1% of those infected experience a more severe illness with central nervous system (CNS) involvement. The frequency and severity of clinical illness increases as age increases. When the CNS is affected, clinical syndromes include aseptic meningitis, encephalitis and myelitis, which are clinically indistinguishable from similar syndromes caused by other viruses. Meningitis is usually characterized by fever, headache, stiff neck, and pleocytosis in cerebrospinal fluid. Encephalitis is usually characterized by fever, headache and altered mental status ranging from confusion to coma, with or without additional signs of brain dysfunction. Other neurological syndromes include cranial and peripheral neuritis or other neuropathies, including acute flaccid paralysis syndrome. **Any suspect case of encephalitis or meningitis should be reported as soon as possible to the MDPH, Division of Epidemiology and Immunization, at 1-617-983-6800 or 1-888-658-2850.**

How to Test for WNV

In order to confirm suspect cases of WNV, it is vital that you send the appropriate samples to the MDPH State Laboratory Institute (SLI) for testing. See page two for further instructions.

Prevention Messages for Your Patients

- Schedule outdoor events to avoid the hours between dusk and dawn when mosquitoes are most active.
- When outdoors, wear long pants, a long-sleeved shirt and socks.
- Use a repellent with **DEET** (N, N-diethyl-m-toluamide), **permethrin, picaridin** (KBR 3023), or **oil of lemon eucalyptus** [p-methane 3, 8-diol (PMD)] according to the instructions on the product label. Review the MDPH Fact Sheet on Mosquito Repellents online at www.mass.gov/dph/cdc/factsheets/factsheets.htm or contact the MDPH at (617) 983-6800 for a hard copy.
- Keep mosquitoes out of the house by repairing any holes in screens and making sure they are tightly attached to all doors and windows.
- Remove areas of standing water around the home.

MDPH Arbovirus Website
www.mass.gov/dph/wnv/wnv1.htm

State Laboratory Institute
Diagnostic Testing for Arboviruses in Humans

Serologic tests and viral culture are available for diagnostic testing for evidence of infection with West Nile virus (WNV), eastern equine encephalitis (EEE) virus and other arboviruses. PCR is also available for detection of RNA of WNV and EEE virus. Multiple tests will be performed to identify viral infection and/or confirm exposure to virus. Testing may require that follow up (convalescent) specimens be submitted.

The following information is critical for accurate interpretation of test results:

- Date of onset of disease symptoms
- Date of specimen collection
- Unusual immunological status of patient (e.g. immunosuppression)
- Travel history (e.g., travel to flavivirus-endemic areas)
- Vaccination history (e.g., vaccination against yellow fever, Japanese encephalitis or Central European encephalitis)
- Disease history (e.g., previous history of viral encephalitis or dengue fever)
- Brief clinical summary including suspected diagnosis (e.g., encephalitis or meningitis)

Specimen types and amounts

Acute serum (≥ 3ml) and CSF (≥ 1ml) should be collected within the first 14 days following onset of symptoms and sent immediately to the State Laboratory. IgM antibody in serum is present in the majority of infected individuals by day 8, but may be present earlier. By 3 weeks after onset (often earlier), virtually all infected individuals will have IgG antibody by enzyme immunoassay (EIA) and plaque reduction neutralization assay (PRNT). In general, convalescent specimens should be drawn approximately 10-14 days after acute phase specimens.

CSF, brain and other tissues will be evaluated by cell culture and, if a sufficient specimen is available, by PCR. Specimens submitted for viral isolation within 48 hrs should be stored and shipped at 4°C. If already frozen, specimens should be shipped on dry ice.

Clinical specimens should be submitted using the State Laboratory Institute's clinical specimen submission form (SS-SL-1-05) (http://www.mass.gov/dph/bls/generalform.pdf). Additional arboviral information can be found on MDPH's arbovirus website (http://www.mass.gov/dph/wnv/wnv1.htm).

State Laboratory Institute

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